

Trends in Extension Research in India-A Case study

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ABSTRACT

'Extension Education' has established itself as a profession and a discipline with three important components of teaching, research and service. The extension system of India has witnessed paradigm shift from 'production led' to 'farmers led' system which in turn has transformed the researches in extension. Today, extension researches and teaching is being practiced by teachers and students in more than 70 State Agricultural Universities (SAUs), four deemed to be universities (DUs), one Central Agricultural University (CAU) and four Central Universities (CUs) with Agriculture Faculty. Furthermore, extension research is being carried out in more than 100 ICAR research institutes and State Departments. The present study outlines the trends in extension research of two leading Agricultural Institutes *viz.* ICAR-IARI, New Delhi and GBPUAT, Pantnagar based on indepth review of M.Sc. and Ph.D. research work at respective Institutes. The present paper also reviews the extension research published in 'Indian Journal of Extension Education'. The findings showed that besides traditional areas of extension research new areas like 'ecotourism', 'nutritional security', 'up scaling and out scaling of farm innovations', 'validation of ITK's' and 'climate change adaptation' has been picked up by extension researchers nationwide leaving aside the old notion of transfer of technology.

Keywords: Extension Research, Production Led, Farmers Led and Paradigm Shift.

INTRODUCTION

Research is an important requirement for continuous growth of any discipline. Extension education did not begin as subject first. The extension works were initiated first and the rich experiences, wisdom and experiments led to evolution of the discipline much later. In India with the advent of first ever post graduate programme in extension education at Bihar Agricultural College, Sabour (Bihar) in 1955, extension education established itself as an academic discipline, later on post graduate program started at College of Agriculture Nagpur (1958). The most notable and well organized Ph.D. program initiated at IARI, New Delhi in 1961. This well organised program with standard curriculum and suitable research thrust inspired many teachers, students and institutions in the country. In 1963, Punjab Agricultural University started Ph.D. program with well trained faculties under the leadership of IARI. With the formation of Indian Society of Extension Education with headquarter at IARI, New Delhi in 1964, research further got pace and connected several extension researchers together. Another landmark in history of extension research was establishment of the ICAR-Division of Extension in

1971 under leadership of DDG (Extension) which gave momentum to TOT programs, National Demonstrations, KVK's, ORP, LLP, technology refinement and assessment, IVLP and AICRP (1977).

Today, extension researches and teaching is being practiced by teachers and students in more than 70 State Agricultural Universities (SAUs), four deemed to be universities (DUs), one Central Agricultural University (CAU) and four Central Universities (CUs) with Agriculture Faculty. Furthermore, extension research is being carried out in more than 100 ICAR research institutes and State Departments. Moreover ICAR has sanctioned Centre for Advanced Studies in Agricultural Extension at Division of Agricultural Extension IARI to organise series of training courses in advances in extension research. Government has established separate institutes like MANAGE and NIRD Hyderabad, under different ministries to carry out extension research and services. Overall, it can be concluded as 'Extension Education' has established itself as a profession and a discipline with three important components of teaching, research and service.

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The Indian public agricultural extension system is one of the largest knowledge and information dissemination institutions in the world. The system played a critical role during the Green Revolution period, but in recent years, it had undergone a high level of scrutiny (Sontakki et al., 2010; Pal, 2008; Joshi et al., 2005). Undoubtedly, without a well-functioning national agricultural research system (NARS) capable to produce relevant technologies and knowledge base, any amount of reforms in the agricultural extension system will be unsuccessful (Binswanger-Mkhizi and Zhong, 2012). The reforming of NARS in India has been the subject of extensive analysis and the focus of several high-powered committees (NAAS, 2005; NFC, 2006; Pal, 2008; ICAR, 2011). Although the NARS has been responding to the challenges faced by Indian agriculture, it is often criticized for not attending to the demands for improved technologies and also for the poor linkages between research and extension systems (Desai et al., 2011).

Earlier in 1960's, extension research was focused on adoption of new technologies to increase production since low production of major crops was the main problem of India and therefore extension service was in limelight rather than extension research to achieve Green Revolution. By the end of 1970s, the Green Revolution type of extension system had largely achieved its major goal of increasing the area under high-yielding varieties (Ameur, 1994). In the late-1970s, the agricultural extension system became mostly involved in the distribution of agricultural inputs through the state agricultural depots and handling of the subsidies that were provided through various agricultural development programs. A Training and Visit (T&V) system was introduced in extension services on a pilot scale in Rajasthan in 1974 with World Bank funding support and was scaled up to several other states in 1977 (Ameur, 1994). Researches were carried out to assess its impact and impressive results were documented by the studies that evaluated the T&V system, the issues related to sustainability of funding, high requirement of staffing, and the quality of staff became the key concerns (Feder et al., 1987; Anderson and Feder, 2004).

Jhamtani and Singh (1980) noted that up to 1980, studies have revealed that post graduate thesis research gave more emphasis on Program planning, Diffusion and adoption and Communication Methods and Media. Content analysis of research papers published in Indian Journal of Extension Education from 1965-1987 revealed

that, research gave emphasis on Training and Communication and Diffusion (Kumar and Hansra). Even though numerous challenges and opportunities has emerged still during the last 50 years major emphasis has been given on production led extension (Duraisamy 2007).

Extension system and extension research has close linkage. The extension system gives ways to new and innovative research which in turn improves extension system. The extension system of India has been transformed from production led to farmers led system which in turn has transformed the researches in extension. Table 1 shows the paradigm shift in extension approach which led to the shift in extension research areas.

The present study explores the researched areas in extension and tries to highlight the paradigm shift in extension research on the basis of M.sc and Ph.D. researches done at GBPUAT, Pantnagar and ICAR-IARI, New Delhi. The present paper also highlights the trends and shift in extension researches, being published in Indian Journal of Extension Education.

METHODOLOGY

In present review study the M.Sc. thesis from 1983 to 2015 (n=205) and Ph.D. thesis from 1997 to 2015 (n=51) conducted at Department of Agricultural Communication, GBPUAT Pantnagar were reviewed. Based on the major theme of research, thesis were divided into 12 exhaustive and mutually exclusive categories as 'Journalism and Media', 'Communication', 'ICT', 'Training and Human Resource Development', 'Impact assessment', 'Content Analysis', 'Teaching and learning', 'Adoption and Diffusion', 'Management, Entrepreneurship', 'Gender Studies' and 'New areas'. Based on the research methodology thesis were divided into Experimental Research (Field Experiments), Ex Post Facto Research (Survey Research, Case Studies and Evaluative Research) and Action Research.

Based on broad research theme Ph.D. researches from 1961 to 2015 (n=234) at Department of Agricultural Extension, ICAR-IARI was divided into 13 exhaustive and mutually exclusive categories as 'Management', 'Communication', 'Perception and Socio economic status', 'Training and Human Resource Development', 'Journalism and Media', 'Adoption and Diffusion', 'Entrepreneurship and marketing', 'Impact assessment', 'Participatory extension', 'Gender studies', 'ICT', 'Climate change and ITK' and 'teaching and learning'.

Research paper published in Indian Journal of Extension Education from 2010 to 2015 (12 issues, 324 research papers) were reviewed on the basis of major research work and were divided into 12 categories as 'Training and Human Resource Development', 'Information and Communication Technology' (ICT), 'Entrepreneurship', 'Management', 'Participatory Extension', 'Gender studies', 'Impact assessment', 'Journalism and Media', 'Teaching and Learning', 'Communication', 'Adoption and Diffusion' and 'Indigenous Technical Knowledge' (ITK).

RESULTS AND DISCUSSION

Extension Research at GBPUAT Pantnagar

It is evident from table 2 that among M.Sc. research maximum research has been done in Journalism and Media and Communication followed by ICT, Training and Human

Resource Development, Impact assessment, Content Analysis, Teaching and learning, Adoption and Diffusion, Management, Entrepreneurship, Gender and new areas like ecotourism. In case of Ph.D. research, maximum research has been done in Communication and ICT followed by Training and Human Resource Development, Teaching and learning, Management, Gender, Journalism and Media, Participatory extension, Entrepreneurship and Impact assessment (table 3).

Table 4 reveals that survey research (82.90 %) is the most dominant methodology in M.Sc. research followed by evaluative research (8.80%), experimental research (3.40%), case studies (2.90%) and action research. In case of Ph.D. research survey research (70.60%) is the most used research methodology followed by action research (13.70%), evaluative research (9.80%) and case studies (5.90%) (Table 4).

Table 1: Paradigm shift in extension approach which led shift in extension research areas

Purpose/Objective	Transfer of production technologies	Capacity building (especially farmers extensionist), create para-professional extension workers, creating or strengthening local institutions
Goal	Food self-sufficiency	Livelihood security including food, nutrition, employment to alleviate poverty, sustainability and conserving bio-diversity
Approach	Top-down, commodity and supply driven	Participatory, bottom-up and demand driven
Actors	Mostly public institutions	Pluralistic with public, private, non-government and farmers organizations as a partner rather than competitors
Mode	Mostly interpersonal/ individual approach	Integration of clients oriented on-farm participatory/experiential learning methods supported by ICTs and media
Role of extension agent	Limited to delivery mode and feedback to research system	Facilitation of learning, building overall capacity of farmers and encouraging farmers experimentation
Linkages	Research-Extension-Farmers	Research- Extension-Farmers Organizations(FIGs, CIGs, SHGs)

Source: K D Kokate, P B Kharde, S S Patil and B A Deshmukh (2009)

Table 2: Percentage of research areas and major themes of M.Sc. Thesis at GBPUAT

		Pantnagar from 1983 to 2015 (n=205)	
Research Area	Major Themes	Frequency	Percentage
Journalism and Media	Study of AIR programs, Slide and Tape Media, Effectiveness of documentary films, Formats of different media, Radio listening pattern, Farm radio broadcast strategies, Different TV program formats, Folder effectiveness, TV watching behavior, Media utilizations at farmers fair, Impact of mass media, Media need and usage, Effectiveness of farm magazines, Radio program testing, Audio and video effectiveness, Farm literature relevance, Media mix, Community wall newspaper, Advertisement strategy and effectiveness	58	28.30
Communication	Communication profile of farmers, Communication gap, Communication need, Communication behavior, Communication media, Interpersonal communication, strategies of communication in social movements, speech communication, Communication networking, group communication behavior, Indigenous communication system and Speaking skills	46	22.40
ICT	Video effectiveness in different extension strategies, Video production technology, ICT based instruction modules, ICT Platform utilization, Study of successful strategies of e Choupal and IFFCO, mobile usage in extension, e readiness and website content analysis	19	9.30
Training and Human Resource Development	Training process, Trainee's need assessment and perception, Trainees characteristics, Impact of training programs, Communication training needs, Qualitative analysis of training and Training preferences	18	8.80
Impact assessment	Adult education Program, Programs related to tribal population, IRDP, ICDS, TRYSEM, <i>Krishi Darshan</i> , <i>Janvani</i> -Community radio Pantnagar, Radio programs, Child health programs, Private extension and Environment Conservation programs	14	6.90
Content Analysis	Post Graduate studies at GBPUAT Pantnagar, Annula reports, Hindi magazines, and Community radio-Janvani	10	4.90
Teaching and learning	Teachers attitude, Students learning styles and attitude, Instructional modules for teaching effectiveness, perception on classroom teaching, education technology usage, effective teaching, distance learning and Quality assurance	9	4.40
Adoption and Diffusion	Adoptions of innovations of Dairy technologies, Biogas plants, soil health and crop production	9	4.40
Management	Job satisfaction, Job performance, Extension personnel effectiveness, management of training institutes, role performance and Leadership	8	3.90
Entrepreneurship	Agri-Business enterprises, buying behavior, entrepreneurial intentions, enhancing entrepreneurial skills and information need for entrepreneurship	6	2.90
Gender	Gender Participation, Women empowerment, Information need of Women and SHG's, Nutritional security and Livelihood	6	2.90
New areas	Ecotourism and Studies related to Rural Youth	2	0.90

Table 3: Percentage of research areas and major themes of Ph.D. Thesis at GBPUAT

		Pantnagar from 1997 to 2015 (n=51)	
Research Area	Major Themes	Frequency	Percentage
Communication	Marketing Communication, Communication patterns, Cohesiveness of groups, Communication strategies related to organic farming, Trainee's communication and facilitative skills	9	17.70
ICT	ICT usage assessment, ICT portals, e- choupal, Computer based modules, SMS mobile alerts, Mobile telephony usage in Reuters market Light and e content generation and effectiveness	7	13.80
Training and Human Resource Development	Training management, Capacity buiding of hill farmers, Designing training module, and Strategy designing for KVK trainers	6	11.80
Teaching and learning	Educational Technology, Classroom teaching effectiveness, online courses effectiveness in learning, teachers evaluation by students, and teachers performance	5	9.90
Management	KVK effectiveness, Organizational Behavior of HGO, Rural Leadership, Managerial skills and Natural resource management	5	9.90
Gender	Women empowerment through SHG, Gender sensitivity training, performance of women groups, Gender analysis and Empowerment of tribal women	5	9.90
Journalism and Media	Agricultural journalism, Farm Publication effectiveness and Print Media Design	4	7.80
Participatory extension	People participation, designing participatory community radio modules , participatory message designing and contract farming	5	9.90
Entrepreneurship	Entrepreneurial behavior, Study on Agri business central scheme, entrepreneurial potential	3	5.90
Impact assessment	National watershed Development Program, Total Sanitation Campaign of UNICEF	2	3.40

Table 4: Research methodologies used in M.Sc. and Ph.D. research at GBPUAT Pantnagar

	M.Sc. Research	Percentage	Ph.D. Research	Percentage
1. Experimental Research (Field Experiments)	7	3.40	0	0
2. Ex Post Facto Research				
Survey Research	170	82.90	36	70.6
Case Studies	6	2.90	3	5.90
Evaluative Research	18	8.80	5	9.80
3. Action Research	4	2.00	7	13.70
Total	205		51	

Extension Research at ICAR-IARI New Delhi

The thrust of Department of Agricultural Extension, ICAR-IARI is development of innovative research methodological tools including scales and indices for estimation of socio-personal, socio-economic and psychological variables, development of convergence led, ICT mediated Extension Models for multi-stakeholder participation, effective communication and faster diffusion of improved farming technologies, organizational management and impact assessment research, leveraging agriculture for nutritional security; agri-nutri education and behavioural change communication methodologies, pathways from agriculture to nutrition research for promotion of agri-business and rural entrepreneurship, development of innovative educational and training methodologies and climate change research in social and livelihood perspectives.

Table 5 presents percentage of research areas and major themes of Ph.D. thesis at Department of Agricultural Extension, ICAR-IARI. It is evident from table 5 that among Ph.D. research maximum research has been done

in Mangement and Communication followed by Perception and Socio economic status, Training and Human Resource Development, Journalism and Media, Adoption and Diffusion, Entrepreneurship and marketing, Impact assessment, Participatory extension, Gender, ICT, Climate change and ITK and Teaching and learning

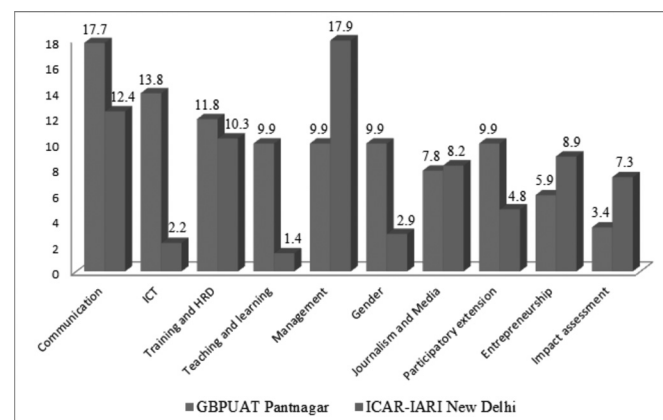


Fig. 1: Comparison of GBPUAT Pantnagar and ICAR-IARI New Delhi Ph.D. Research areas (percentage) since inception of the Ph.D. programme

It is evident from figure 1 that at GBPUAT Pantnagar, 'Communication' and 'ICT' are the major researchable areas followed by 'Training and Human Resource Development', 'Teaching and learning', 'Management', 'Gender', 'Journalism and Media', 'Participatory Extension', 'Entrepreneurship' and 'Impact assessment' however at ICAR-IARI, New Delhi, 'Management' and 'Communication' forms the major researchable area followed by 'Perception and Socio economic status', 'Training and Human Resource Development', 'Journalism and Media', 'Adoption and Diffusion', 'Entrepreneurship

Table 5: Percentage of research areas and major themes of Ph.D. thesis at ICAR-IARI New Delhi from 1961-2015

		(n=234)	
Research Area	Major Themes	Frequency	Percentage
Management	Leadership in adoption, job chart, intra departmental coordination, administrative decentralization, motivational factors, role expectancies, role performance, role prediction, leadership in interpersonal communication, job satisfaction, decision making, supervisory functions, job performance and psychological factors, block level administration, research productivity and management styles, agro eco system, organisational effectiveness, organizational socialization, stress among SAU teachers, creative environment, risk management, leadership styles, Working environment, role of Heads in ICAR institutes, Joint Forest management, Management in SHG's, professionalism in management, Work style, best practice and productivity of scientists,	42	17.90
Communication	Communication network, communication fidelity, differential communication, communication behavior, interpersonal communication, communication behavior and distortion, key communicators, upward communication pattern, communication pattern of small and big farmers, communication pattern of extension personnel, communication of farm information, communication for adoption, Communication pattern under constraints, communication under T and V system, Rural communication and farm communication,	29	12.40
Perception and Socio economic status	Measurement of socio economic status, effect of socio economic status on adoption, decision making, farm credit behavior, adoption behavior, tribal farming system, neo marginal farmers farming situation, farm credit behavior, agricultural labours, tribal socio system, yield gap analysis, mixed farming, sericulture in Tamil Nadu, shifting cultivation, Rubber cultivation in Kerala, socio economic effect of farm mechanization, socio economic effects of tubewell irrigation, socio economic effects of organic farming, accessibility to quality seed	28	11.90
Training and Human Resource Development	Pre service training, analysis of farmers training, training need assessment, training methods effectiveness, training and behavioural change, impact of training, farmers training centres and Krishi gyan kendra, Performance appraisal of training programs	24	10.30
Adoption and Diffusion	Diffusion of innovations, adoption of technology, adoption behavior, differential adoption, adoption of high yielding varieties, rationality in adoption, innovativeness, axiomatic theory building in adoption, dairy technologies, Conservation agricultural technology, Protected cultivation	22	9.50
Entrepreneurship and marketing	Attitude of youth towards youth club, commercialization, farm entrepreneurship, entrepreneurial characteristics, entrepreneurship under TRYSEM, diversification of employment, developing and testing Entrepreneurship Development capsule, vegetable cultivation, commercialization of medicinal plants, production and export of vanilla crop, entrepreneurial needs of agricultural students, theory building in agribusiness management, Needs of Rythu mitra, Role and effectiveness of ACABC, linking farmer to export market, vegetable retail market and peri urban agricultural system, profitability and sustainability, agripreneurship behavior, designing and validating modules on WTO,	21	8.90
Journalism and Media	Effectiveness of audio visuals, radio as mass media, factor affecting viewing behavior, listening pattern, effectiveness of 'farm school on air', effect of print advertisement, farm and home unit of All India Radio, Farm literature production, impact of mass media on farm women, television viewing pattern and traditional folk media	19	8.20
Impact assessment	IADP, farm mechanization, agricultural universities, Small farmer developmental agency (SFDA), Satellite instructional television experiment (SITE), Sugarcane cooperatives, voluntary organizations, Training and Visit system, differential pesticide usage, Orpara Barga in West Bengal, TAWA and NARMADA sagar projects, Integrated Pest Management (IPM) Technologies, indicators of technology assessment, Cauvery delta technological interventions, ATMA, organic farming, NREGA, Agricultural marketing cooperatives, SRI method of Rice, Farmer field school, farm telecast	17	7.30
Participatory extension	Role of panchayat samiti, cooperative system, participation of farmers in government schemes, group action approach, watershed development, participation in voluntary organizations, participatory planning, revitalization of panchayati raj, milk cooperatives performance, common property resource management,	11	4.80
Gender	Self esteem of rural women, Women scientists of ICAR, livelihood pattern of women, role of SHG and NGO in women empowerment, empowerment through SGSY,	7	2.90
ICT	Effect of information technology in agricultural development, effectiveness of innovative ICTs based extension system, decision support system, modules designing and validation	5	2.20
Climate change and ITK	Designing and validating e modules, Climate change led vulnerability and adaptive behavior, ITK of tribal farmers of Arunachal Pradesh, Documentation and Validation of ITKs	5	2.20
Teaching and learning	Integrated functioning of teaching research and extension. Management information system for PG Teaching, learning styles of SAU students	4	1.40

and marketing', 'Impact Assessment', 'Participatory extension', 'Gender', 'ICT', 'Climate change and ITK' and 'Teaching and learning'. It is also notable that ICAR-IARI has also undertaken Ph.D. research on new areas like 'Climate Change' and 'validation of ITK's'. In case of 'ICT', 'Teaching and Learning', 'Gender', 'Entrepreneurship' and 'Participatory Extension' there is high difference between GBPUAT Pantnagar and ICAR-IARI in terms of Ph.D research undertaken however in case of 'Training and Human Resource Development', 'Journalism and Media' researches undertaken in both academic institutes are more or less same.

Extension Research published in Indian Journal of Extension Education (IJEE)

Indian Society of Extension Education founded on 12th June, 1964 with objectives of publishing an extension education journal, "Indian Journal of Extension Education", which shall publish research articles, book-reviews, reports *etc.*, facilitating closer association amongst members and other scientific workers in India and abroad for promoting professional experience in teaching, research and extension, encouraging fundamental as well as applied researches in the field of extension education and organizing National/International symposia, Seminars, Workshops,

Conferences, Training Programmes *etc.* for dissemination of scientific knowledge among scientists, extension personnel, policy makers, and administrators. At present, there are more than 1700 life members with the mission to advance the cause of extension education. The Society publishes quarterly research journal entitled, Indian Journal of Extension Education since 1965.

Maximum research papers has been published in 'Training and Human Resource Development' and 'Information and Communication Technology' (ICT) followed by 'Entrepreneurship', 'Management', 'Participatory Extension', 'Gender, Impact assessment', 'Journalism and Media', 'Teaching and Learning, Communication', 'Adoption and Diffusion' and 'Indigenous Technical Knowledge' (ITK) (Figure 2).

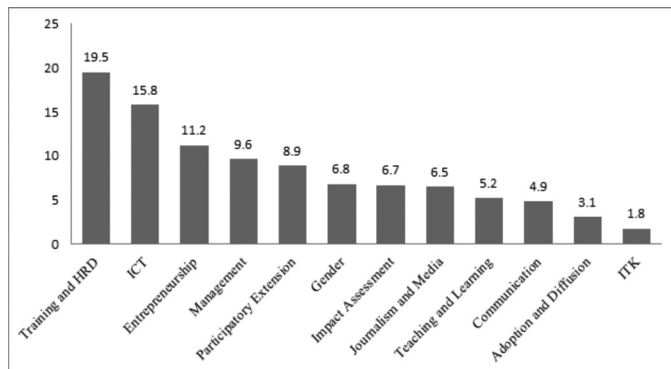


Fig. 2: Percentage of research areas published in Indian Journal of Extension Education from 210 to 2015 (12 issues, 324 research papers).

CONCLUSION

Today extension has established itself as a profession and a discipline. State Agricultural Universities and ICAR institutes are playing a crucial role in extension research. The extension system of India has been transformed from production led to farmers led system which in turn has transformed the researches. In 1960s, India's focus was on increasing production and all research was inclined towards increasing production which led to Green revolution. The major extension approach which followed in green revolution was 'transfer of technology' and as a result farmer's wisdom and indigenous knowledge was ignored largely. It was 1980's when Participatory approaches like PRA were developed where farmers were involved in their problem identification and generating grass root solutions. This led to the shift of extension research from Communication and adoption research towards participatory extension. With the advent of time and new challenges in agricultural extension, new areas of research emerged and extension research focused on 'Training and

Human Resource Development', 'Entrepreneurship', 'Impact Assessment' of various development programs, 'Gender', 'ICT', 'Climate change and 'ITK'.

Overall, at GBPUAT Pantnagar, major researched areas are 'Journalism and Media' and 'Communication' followed by 'ICT', 'Training and Human Resource Development', 'Impact assessment', 'Content Analysis', 'Teaching and learning', 'Adoption and Diffusion', 'Management', 'Entrepreneurship', 'Gender' and new areas like ecotourism however at ICAR-IARI, New Delhi, 'Management' and 'Communication' forms the major researchable area followed by 'Perception and Socio economic status', 'Training and Human Resource Development', 'Journalism and Media', 'Adoption and Diffusion', 'Entrepreneurship and marketing', 'Impact Assessment', 'Participatory extension', 'Gender', 'ICT', 'Climate change and 'ITK' and 'Teaching and learning'. 'Training and Human Resource Development' and 'Information and Communication Technology' (ICT) followed by 'Entrepreneurship', 'Management', 'Participatory Extension', 'Gender, Impact assessment', 'Journalism and Media', 'Teaching and Learning, Communication', 'Adoption and Diffusion' and 'Indigenous Technical Knowledge' are major published areas of Indian Journal of Extension Education.

This paper has presented the current status of research at two leading agricultural institutes and one leading extension journal outlining the major researched areas. Research is a continuous and evolving process. New areas like 'Ecotourism', 'Nutritional Security', 'up scaling and out scaling of farm innovations', 'Validation of ITK's' and 'Climate change adaptation' has been picked up by extension researchers nationwide leaving aside the old notion of transfer of technology. The need of the hour is to adapt our extension research system to cater the present and future farmers needs and for those researches in extension has to evolve year by year.

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